Photo 1: The most dramatic symptoms caused by Imprelis were observed on spruce and pine soon after application in the spring of 2011.

Photo 2: The trees on the left were affected by Imprelis applications to the neighbor's lawn on the right; the Imprelis moved across the property line with water. Neither party knew their trees had been affected until they were informed in 2013, two years after the application of the herbicide.

Photo 3: The country club management had already submitted a claim and received a check for the damage done to many conifers on this golf course. They and perhaps the DuPont representatives did not realize that the decline symptoms on this important, focal point Dawn Redwood were also caused by Imprelis.

Photo 4: Although a claim had already been documented and submitted from this large landscape site, trees formerly thought unaffected exhibited some decline in 2012; hence, 90+ news trees were added to the claim, even though it is highly likely that many of them, such as this fir, will survive. Note yellowing and twisting of new growth (Insert).

The Plant Doctor's LANDSCAPE TIPS

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IMPRELIS HERBICIDE UPDATE - SUMMER 2013

INTRODUCTION:

Imprelis (aminocyclopyrachlor) herbicide was released by DuPont Professional Products to limited markets in 2010 and to expanded markets in 2011.Upon its release, it was regarded as a silver bullet for broad leaf weed control in turfgrass culture including lawns, golf courses, athletic fields, cemeteries and sod farms. By late spring and early summer of 2011, numerous complaints began surfacing from many individuals about suspected damaging effects of Imprelis on many non-target landscape plants. Imprelis herbicide seemed to be the common denominator. Generally, the most commonly voiced concerns were those involving conifer plants, especially Norway spruce and white pine (Photo 1), but many other species of plants were also affected. DuPont and its advisors subsequently acknowledged that the problem was Imprelis and have painstakingly developed some laborious strategies for examining, documenting and processing claims for plant losses. In many situations, maintenance packages were provided to assist recovery of trees. This spring and summer of 2013 mark two years since the original Imprelis herbicide crisis developed.

We have learned many interesting facts about Imprelis. First, it was highly mobile, sometimes moving off-target (downhill) from its application site (Photo 2). Second, while Imprelis was believed to possess a half-life of approximately 30–100 days in soil, it was found to be far more stable in plant tissue than in soil; the chemical seemed to be redistributed to new growing tissue during the next growing season. In conjunction with its stability in plant tissue, many plants seemed to decline even further in 2012 than in 2011—a largely unforeseen and unexpected phenomenon. If desired, please review "IMPRELIS Update-Summer 2012" published in the August issue of *The Landsculptor*.

NEW CLAIMS:

While the Imprelis issue has been a difficult issue for many of us in the plant health care industry, it has undoubtedly been especially troublesome for DuPont. In order to forestall any further decline in plant health, DuPont offered healthcare packages (nutrition, water, pest/disease control) to many claimants. With continued change in the health of plants over the past couple years, many of the claim sites had to be revisited necessitating additional expenditures for site visits, adjustments in plant ratings and subsequent reimbursement values, often to DuPont's disadvantage. Also, as incredulous as it may seem, many new plants (some at new sites) with Imprelis damage were discovered in late 2012 and 2013, approximately one to two years after the Imprelis was applied (Photos 2, 3 and 4).

WEIRD SYMPTOMS:

Some of the most common symptoms observed with Imprelis include tree death, top dieback, shoot death, shoot stunting, and bud death. Some other interesting symptoms have also been observed in the past couple of years: rosetting (Photo 5), shoot swellings, foliar deformation and foliar chlorosis (yellowing) (Photo 4 & Insert).

WOOD MANAGEMENT:

On the original Imprelis label, it was advised not to use grass clipping in landscape and mulch beds due to potential harmful effects of Imprelis residues on non-turf plants. Likewise, it is currently inadvisable to use wood material such as mulch from trees affected or killed by Imprelis (Imprelis-affected wood is fine for lumber and firewood). Perhaps, composting chips from Imprelis-affected trees for several months to a year should reduce the herbicide residue to safe levels provided proper composting methods are used. There are labs that can test for Imprelis residues but regardless of the residue content a lab might obtain (ppm or ppb), they still might not be able to guarantee plant safety from Imprelis-contaminated mulch. Possibly the best approach is to perform a bioassay using Imprelis-sensitive plants such as green beans or tomatoes. In regards to soil, the finding soon became apparent that Imprelis was not as persistent in soil as in plant tissue. In extreme situations where plant death occurred, landscapes have been replanted with good success (Photos 6A and 6B).

OUT ON A LIMB:

According to most claimants with whom I have talked, DuPont has done an excellent job addressing tree damage caused by Imprelis. However, many tree owners were very angry and depressed after witnessing damage to their grand, old trees (Photo 7). The tops of some of these trees have declined, and many limbs did not produce new buds and, hence, new growth in 2012. Surprisingly however, many of these trees developed lateral shoots in 2013 despite having dead tips (Photo 7 Insert). It is possible that with time, many of these trees may recover ... at least somewhat. Perhaps it can be argued that it would be better to keep some of these large old trees that might recover with sufficient time than to replace them with new plants, which will not likely achieve a large grand stature in our lifetimes. Did DuPont settle some of the claims too quickly?

Even though two years have passed since the original Imprelis applications, it is not likely that Imprelis issues will disappear anytime soon.

For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

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Photo 5: One of the more interesting symptoms of the wide variety of symptoms noted with Imprelis on plants was rosetting on conifers.

Photo 6A: The honey locusts in this large Wyandotte parking lot were affected by Imprelis in 2011. Into late 2011, the cambium tissues were still green, possibly forecasting recovery in 2012. Unfortunately, most of these trees died by the spring of 2012, possibly from Imprelis-induced winter injury.

Photo 6B: By 2013, the honey locust trees in Photo 6A had been removed and new plantings were installed with good success. The Imprelis in the soil had apparently dissipated or leached sufficiently to permit replanting.

Photo 7 (left): These large, grand old spruce trees possessed mostly dead buds and very little new growth in 2012. In the spring of 2013, most limbs produced new lateral shoots (Insert) even though the tips of branches were dead. With sufficient time, these trees might recover sufficiently to once again gain an acceptable status as desirable landscape trees.